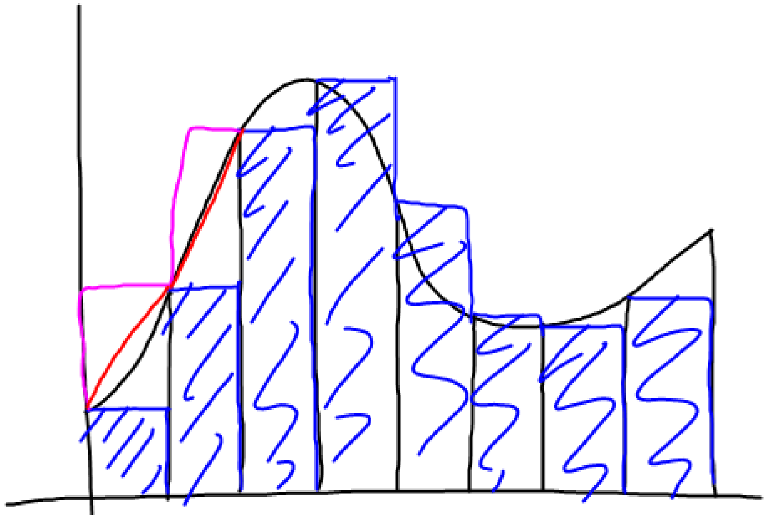
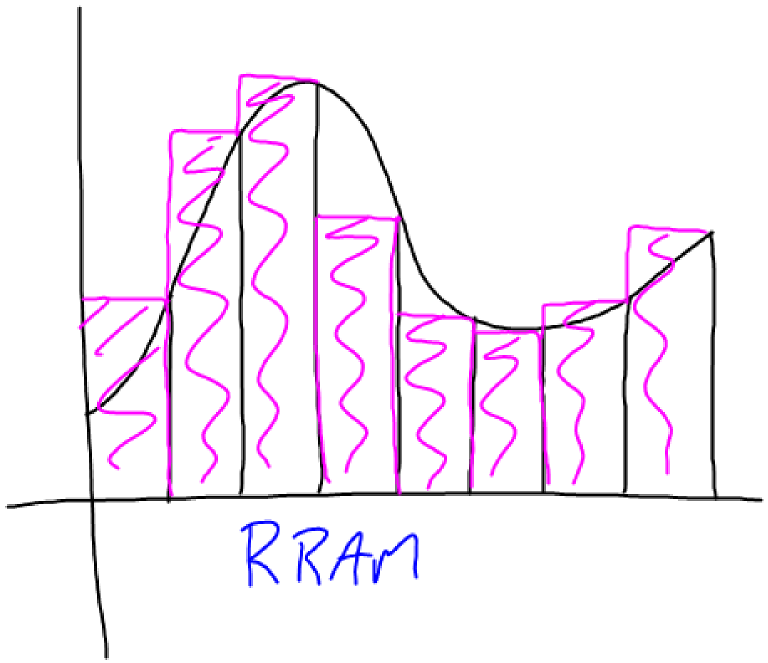
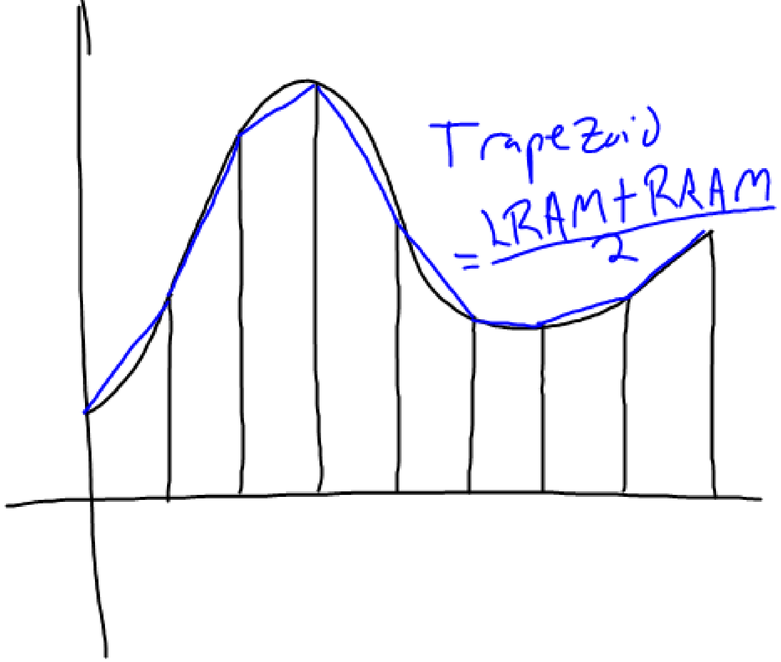


LRAM

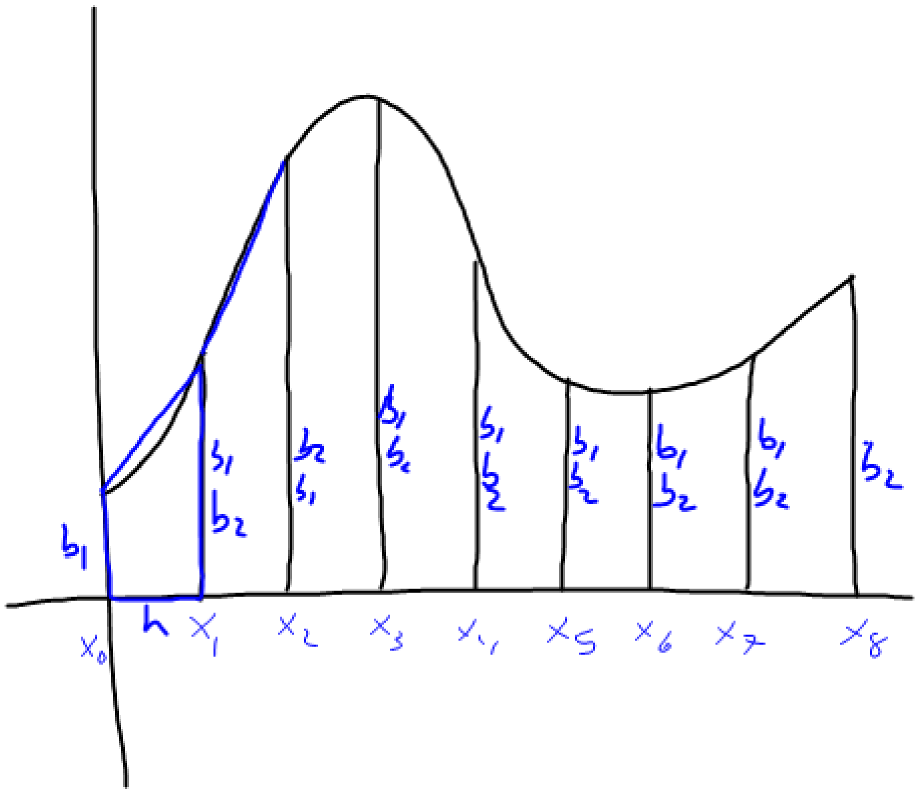


RRAM



Trapezoid

$$= \frac{LRAM + RRAM}{2}$$



Area Trapezoid

$$\frac{h}{2}(b_1+b_2)$$

Trapezoid Rule

$$\frac{h}{2}\left(f(x_0)+2f(x_1)+2f(x_2)+\ldots+2f(x_7)+f(x_8)\right)$$

$$=\int_a^b f(x)\,dx$$

$$=\frac{LRAM+RRAM}{2}$$

During a cold day in February the tempuratures during a school day are given below. What is the average tempurature during the day?

Time	8am	9	10	11	12	1pm	2pm
Temp.	12	10	9	11	13	16	18

it is not 12.714°

$$\frac{1}{2}\left(12+2(10)+2(9)+2(11)+2(13)+2(16)+18\right)$$

$$=74$$

$$\frac{1}{b-a}\int_a^b f(x)\,dx$$

$$\frac{1}{14-8}(74)=12.\overline{33}$$

2

$$\int_{-h}^{h} ax^2+bx+c \;=\; F(h)-F(-h)$$ where $F(x)$ is the antiderivative

2. $\frac{1}{3}ah^3 + \frac{1}{2}bh^2 + ch$

$\cancel{\frac{1}{3}h\left(ah^2 + \frac{3}{2}bh + 3c\right)}$

$\left(\frac{1}{3}ah^3 + \frac{1}{2}bh^2 + ch\right) - \left(-\frac{1}{3}ah^3 + \frac{1}{2}bh^2 - ch\right)$

$\frac{1}{3}ah^3 + \cancel{\frac{1}{2}bh^2} + ch + \frac{1}{3}ah^3 - \cancel{\frac{1}{2}bh^2} + ch$

$\frac{2}{3}ah^3 + 2ch$

$\frac{1}{3}h\left(2ah^2 + 6c\right)$

$y_0 = ah^2 - bh + c$

$y_1 = c$

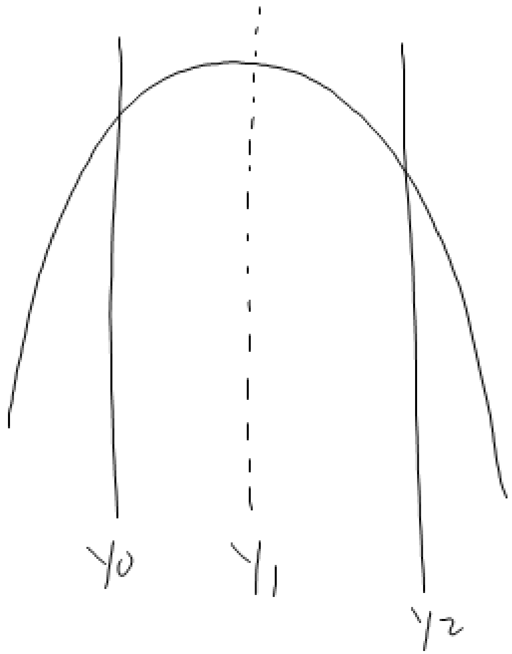
$y_2 = ah^2 + bh + c$

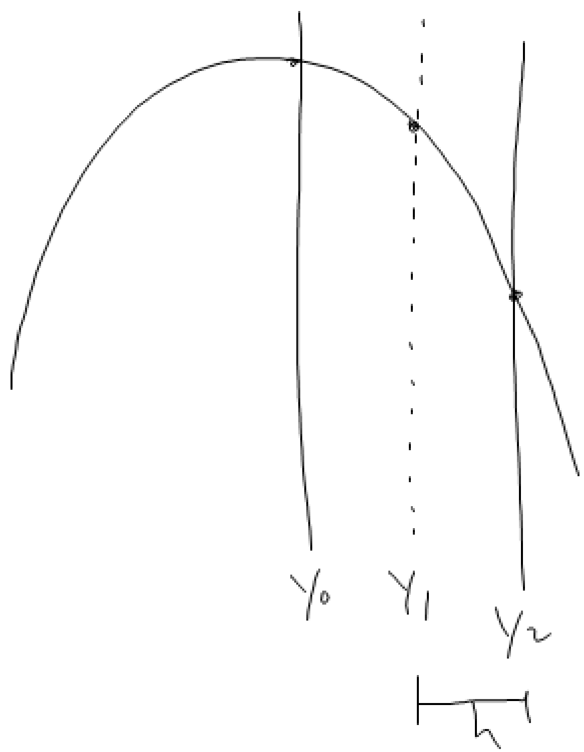
$y_0 + y_2 = 2ah^2 + 2c$

$$y_0 + 4y_1 + y_2 \Rightarrow ah^2 \cancel{-bh} + c + 4c + ah^2 \cancel{+bh} + c$$

$$= 2ah^2 + 6c$$

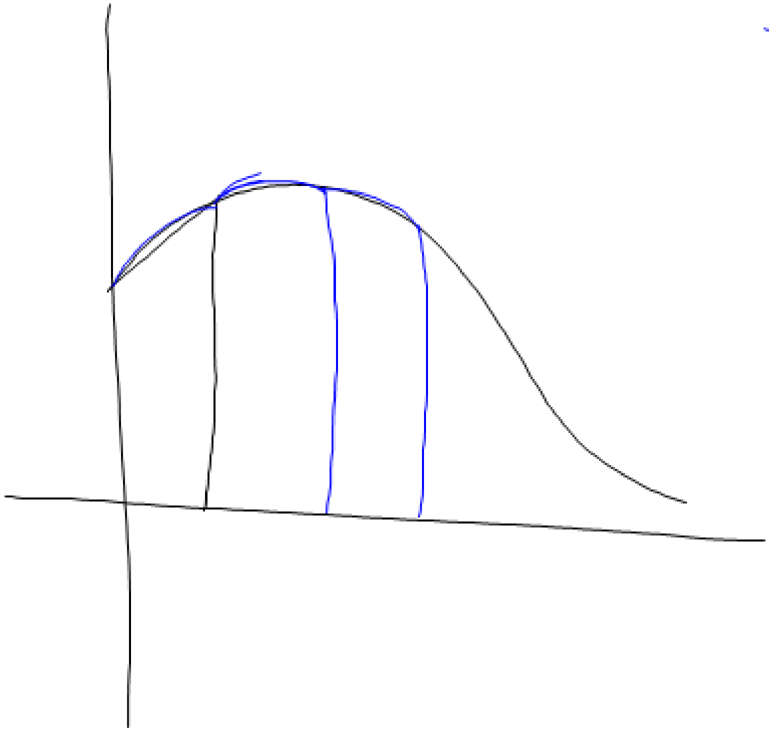
So $\boxed{\text{Area} = \frac{h}{3}(y_0 + 4y_1 + y_2)}$





Simpson's Rule

$$\frac{h}{3}\left(y_0 + 4y_1 + 2y_2 + 4y_3 + 2y_4 + \cdots + 4y_{n-1} + y_n\right)$$



Simpson's Rule

To approximate $\int_a^b f(x)\,dx$, use

$$S = \frac{h}{3}\left(y_0 + 4y_1 + 2y_2 + 4y_3 + \cdots + 2y_{n-2} + 4y_{n-1} + y_n\right),$$

where $[a, b]$ is partitioned into an *even* number n of subintervals of equal length $h = (b - a)/n$.

Sect. 5.5

#1-6 (3), 7-12, 30